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*Department of Geology,
The University,
Exeter, Devonshire,
U.K.*

Quaternary geology of the Ivigtut–Nunarssuit region, South-West and South Greenland

Michael Kelly

In order to provide data for the 1:500 000 map sheet (Quaternary geology of Greenland, sheet 1) a reconnaissance was made of the Quaternary geology of the Ivigtut and Nunarssuit regions shown on Fig. 16, in conjunction with a gravity survey carried out by D. J. Blundell, University of London. The coverage of the southern area, however, was very scant due to prolonged bad weather and difficult pack ice conditions. In addition the survey of marine limits was extended to the adjacent Frederikshåb and Neria areas to the north.

The topography of the area consists of a rolling plateau descending from about 800 m in the north to less than 300 m in the south, dissected by steep sided fjords and inlets. Notable are the 'coastal mountains' – relatively sharp featured hills standing above the plateau level on the western ends of peninsulas and offshore islands. Other isolated eminences occur inland up to c. 1200 m.

Observations

Glacial deposits are very limited in their extent and moraine ridges and other ice margin features are relatively rare. However erratics and glacial erosion features show that the area has been glaciated out to its western extremity. Several progressively younger phases of glaciation can be defined broadly by the distribution of the scattered deposits and features. The more important of these are:

(1) A relatively sharp limit between ice scoured surfaces and autochthonous boulder fields and deep weathered bedrock occurs in the coastal mountains at heights of 500–700 m. This seems to define the upper limit of recent ice sheet glaciation in the area and puts its outer terminus at about 50–60 km from the present ice sheet margin.

(2) Deposits and degraded features occur at low elevations in the coastal mountains around Arsuk in a zone 30–45 km from the present margin. These include some features which had been earlier identified as marine shorelines by Steenstrup (*in* Jessen, 1896) e.g. Ikerasak, 94 m.

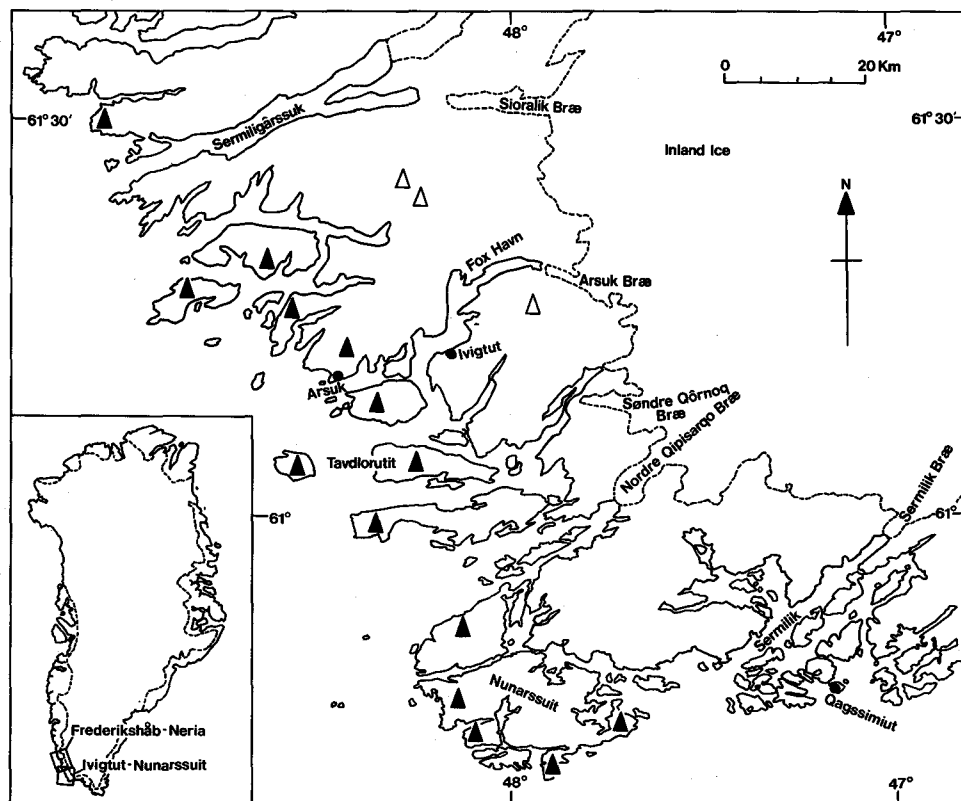


Fig. 16. Map of Nunarssuit – Sermiligårssuk region. Solid triangles – ‘coastal mountains’; open triangles – ‘interior mountains’.

(3) Deposits and locally well preserved features at about 10 km from the ice margin which include the terminal moraines at Fox Havn described by Holst (1886).

Local glaciers occur at present on some of the coastal mountains and in the highest of the interior mountains (not all those shown as such on current topographic maps, e.g. 1:250 000, Geodetic Institute, are actually glaciers). On Tavdlorutit island the two local glaciers have an older series of moraines belonging to them, in addition to the recent historic moraines, which appear to be of considerable age beyond the range of lichen dating.

Marine deposits are very limited, mainly beach deposits and parts of raised alluvial deltas. However the limit of marine submergence before glacio-isostatic uplift is very well marked in many areas by trim lines between clean and till mantled rock outcrops. Elsewhere the position of the limit could be estimated from perched erratic limits, alluvial delta surfaces and beach deposits.

The marine limit in this region and in the adjacent one of Frederikshåb-Neria (fig. 16) is very uniform, with most values lying between 35 and 55 m. There is a regional trend with values of 50–55 m in the north decreasing to 35–40 m in the south. There is no clear consistent trend perpendicular to the ice margin discernible within the background of variation caused by using different categories of evidence.

In situ marine macrofossils are very rare and only one occurrence was found, in Sermili-gårssuk, of a fauna dominated by *Mytilus edulis* and *Balanus* sp. In addition reworked marine shell fragments and concretions containing marine shells were found in the moraine and outwash of the glacial readvance of the last few centuries, at Sioralik Bræ, Søndre Qôrnoq Bræ, Nordre Qipisarqo Bræ and Sermilik Bræ. These are obviously derived from marine deposits beneath the present ice sheet. In addition unfossiliferous concretions were found in the moraines of the outlet glacier in Nigerdlikasik, Kvanefjord, Frederikshåb.

Conclusion

The working hypothesis is that the geological events represented are the most recent ones feasible unless there is direct evidence of an older date. On this basis the glacial phases are presumed to represent the maximum ice sheet glaciation of the Wisconsin – Weichselian Stage and subsequent minor readvances during the Late Glacial and early Holocene. The general succession is comparable to that of the adjacent areas to the north (Kelly, 1975a). The sketchy C^{14} based chronology from there suggests that coastal areas were deglaciated by 10 000 B.P. and that the interior moraine system (Aussivik) which is the probable correlative of the Fox Havn moraines is early Holocene at the youngest, perhaps older. In the Ivigtut-Nunarssuit region as in the area further south-east (Kelly, 1975b) the ice sheet has subsequently readvanced significantly in the late Holocene from its Holocene minimum, culminating in the advances of the last few centuries.

Without C^{14} dating of shorelines the history of the emergence of the area can only be reconstructed by comparison with the slightly better known areas to the north and south-east, where in general emergence has decelerated during the Holocene reaching negligible values 3000–4000 years ago (Kelly, 1973).

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*Department of Environmental Sciences,
University of Lancaster,
 Bailrigg,
Lancaster LA1 4YQ,
U.K.*

Current research in the Ilímaussaq region, South Greenland

Compiled by **John Rose-Hansen and Henning Sørensen**

The 1976 season's field work in the Ilímaussaq region was concerned with the lujavrites of the south-eastern part of the Ilímaussaq alkaline intrusion, the uranium-rich rocks along the intrusion's northern contact, the environmental geochemistry and ecology of the Narssaq region, and the Narssaq intrusion situated to the west of the Ilímaussaq intrusion. Each of these projects is briefly discussed below.

Field mapping of green aegirine lujavrite (Henning Bohse)

Detailed mapping on a scale of 1:5000 of an area between the two branches of the upper part of Lakseelv in the southern half of the Ilímaussaq alkaline intrusion was carried out. The work was a continuation of mapping initiated in 1974 (Bohse, in Bohse *et al.*, 1975). No essentially new developments in the understanding of the geology of the area resulted from this summer's field work.

Further attention was given to the globular natrolite-analcime nodules mentioned in Bohse *et al.* (1975) and it became clear that these nodules are genetically associated with partly assimilated inclusions of naujaite in lujavrite. Numerous lujavritic pegmatites up to 10 m wide and with big rusty steenstrupine crystals occur in the area. These pegmatites become more common towards the east.